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Attorney Docket No. 77670/593

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Reissue Applicant** : Hiroyuki Nakane, Chikara Ohto,  
Shinichi Ohnuma, Kazutake Hirooka,  
Tokuzo Nishino  
**Reissue Serial No.** : 09/902,651  
**Reissue Application Filed** : July 12, 2001  
**Patent No.** : 5,935,832  
**Issued** : August 10, 1999  
**Title** : FARNESYL DIPHOSPHATE SYNTHASE  
**Examiner** : STEADMAN, David J.  
**Art Unit** : 1656

Box REISSUE  
Assistant Commissioner for Patents  
Washington, D.C. 20231

**SUBSTITUTE REISSUE DECLARATION AND POWER OF ATTORNEY**

We, Hiroyuki Nakane, Chikara Ohto, Shinichi Ohnuma, Kazutake Hirooka and Tokuzo Nishino, hereby declare as follows:

1. We believe that we are the original, first and sole inventors of the invention described and claimed in United States Letters Patent No. 5,935,832 ("the '832 patent"), granted August 10, 1999 and for which a reissue patent is sought on the invention entitled FARNESYL DIPHOSPHATE SYNTHASE, the specification of which was filed on July 12, 2001 as reissue application number 09/902,651 and was amended on July 12, 2001, March 18, 2005, November 7, 2005, March 31, 2006, June 2, 2006, June 23, 2006, December 22, 2006, June 29, 2007, October 30, 2007 and June 3, 2008.
2. We declare that we have reviewed and understand the contents of the above identified specification, including the claims, as amended by the amendments referred to above.

3. We acknowledge the duty to disclose information that is material to patentability of the new and amended claims as defined in Title 37, Code of Federal Regulations, § 1.56.
4. We hereby claim the foreign priority benefit under Title 35, United States Code, Section 119 of the Japanese application listed below.

**Foreign Application Priority Information:**

<u>Serial No.</u>	<u>Filing Date</u>
Japan 8-213211	Jul.24, 1996

5. We believe the original patent to be partly inoperative or invalid by reason of the patentees claiming less than they had the right to claim in the patent.
6. At least one error upon which reissue is based is described below, and the error is in claim 1.

Claim 1 of the '832 patent is directed to a mutant prenyl diphosphate synthase, and the claim is reproduced below.

Claim 1. A mutant prenyl diphosphate synthase having a modified amino acid sequence, wherein

said mutant diphosphate synthase comprises an aspartic acid-rich domain having the sequence,  $D_1D_2X_1X_2(X_3X_4)D_3$ , in region II of said mutant prenyl diphosphate synthase,

wherein each of  $D_1$ ,  $D_2$ , and  $D_3$  denote an aspartic acid residue;  $X_1$ ,  $X_2$ ,  $X_3$ , and  $X_4$  are each independently any amino acid and  $X_3$  and  $X_4$  are each optionally independently present in the aspartic acid rich domain, and wherein

said mutant prenyl diphosphate synthase comprises (1) at least one amino acid substitution, said at least one amino acid substitution located at least one amino acid position selected from (a) an amino acid between  $D_1$  and the amino acid residue at the fifth position upstream of  $D_1$  and (b) the amino acid residue located

one amino acid position upstream of D<sub>3</sub>; (2) at least one additional amino acid inserted between D<sub>3</sub> and the first amino acid upstream of D<sub>3</sub>; or a combination of (2) and (3); wherein said mutant prenyl diphosphate synthase synthesizes prenyl diphosphate which is shorter than prenyl diphosphate synthesized by a corresponding wild-type enzyme.

The recitation of "a combination of (2) and (3)" has a typographical error and the recitation should read "a combination of (1) and (2)". However, the error on which the reissue is based is not this typographical error. Applicants point out the typographical error in order to help the Examiner better understand the scope of claim 1, so that the Examiner would better understand the description of the error on which the reissue is based.

Claim 9 of the '832 patent depends on claim 1, and is reproduced below.

Claim 9 A mutant prenyl diphosphate synthase according to claim 1 wherein at least one amino acid selected from phenylalanine at position 77, threonine at position 78, valine at position 80, histidine at position 81, and isoleucine at position 84 has been substituted by another amino acid, and/or two amino acids have been inserted in between isoleucine at position 84 and methionine at position 85 in the geranylgeranyl diphosphate synthase as set forth in SEQ ID NO: 1, wherein the phenyl alanine at position 77 has been replaced with tyrosine, the threonine at position 78 has been replaced with phenylalanine or serine, the valine at position 80 has been replaced with isoleucine, the histidine at position 81 has been replaced with leucine or alanine, or the isoleucine at position 84 has been replaced with leucine; or proline and serine have been inserted in between the isoleucine at position 84 and the methionine at position 85.

Even though claim 9 depends on claim 1, the embodiment of the mutant prenyl diphosphate synthase according to claim 9 wherein proline and serine have been inserted in between the isoleucine at position 84 and the methionine at position 85 of the geranylgeranyl diphosphate synthase set forth in SEQ ID NO:1 (please see the last three lines of claim 9 reproduced above, or the last two lines of claim 9

printed in the '832 patent) is NOT covered by claim 1. Applicants note that in the amino acid sequence of geranylgeranyl diphosphate synthase set forth in SEQ ID NO:1, position 82 corresponds to D<sub>1</sub>, position 83 corresponds to D<sub>2</sub> and position 86 corresponds to D<sub>3</sub> of the sequence, D<sub>1</sub>D<sub>2</sub>X<sub>1</sub>X<sub>2</sub>(X<sub>3</sub>X<sub>4</sub>)D<sub>3</sub>, recited in claim 1. The embodiment of the mutant wherein "proline and serine have been inserted in between the isoleucine at position 84 and the methionine at position 85" of the geranylgeranyl diphosphate synthase set forth in SEQ ID NO:1 is not covered by claim 1 of the '832 patent because the two amino acids are inserted between position 84 and position 85, and such an insertion is

NOT (1) at least one amino acid substitution, said at least one amino acid substitution located at least one amino acid position selected from (a) an amino acid between D<sub>1</sub> and the amino acid residue at the fifth position upstream of D<sub>1</sub>, and (b) the amino acid residue located one amino acid position upstream of D<sub>3</sub>; and

NOT (2) at least one additional amino acid inserted between D<sub>3</sub> and the first amino acid upstream of D<sub>3</sub>, recited in claim 1.

Regarding limitation (2), at least one additional amino acid inserted between D<sub>3</sub> and the first amino acid upstream of D<sub>3</sub>, as recited in claim 1, applicants note that the first amino acid upstream of D<sub>3</sub> is position 85 if the amino acid sequence of SEQ ID NO:1 is considered as the wild type prenyl diphosphate synthase. In contrast, in the embodiment of the mutant according to claim 9, the proline and serine are inserted between position 84 and position 85, not between position 85 and position 86 as required by limitation (2) of claim 1.

As a result, the '832 patent is partly inoperative or invalid by reason of the patentees claiming less than they had the right to claim in claim 1 of the patent.

7. All errors that are being corrected in the present reissue application up to the time of filing of this declaration arose without any deceptive intention on the part of the applicants.
8. We hereby offer to surrender the original patent upon reissue of the patent.
9. We declare that Toyota Jidosha Kabushiki Kaisha is the assignee for the '832 patent as evidenced by an assignment from us to the assignee recorded at

the United States Patent and Trademark Office at reel 8647, frame 0509. As provided by the statement attached, Toyota Jidosha Kabushiki Kaisha assents to the filing of this reissue application, and confirms the reissue applicants' offer to surrender the original '832 patent as stated in the previous paragraph.

10. Our residence addresses, post office addresses and countries of citizenship are stated below next to our names.
11. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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**ASSENT BY ASSIGNEE**

Toyota Jidosha Kabushiki Kaisha, which is the assignee of the entire right, title and interest in United States Patent No. 5,935,832, entitled FARNESYL DIPHOSPHATE SYNTHASE, as a result of an assignment recorded in the United States Patent and Trademark Office at reel 8647, frame 0509, hereby assents to the filing of the reissue application for said Patent No. 5,935,832 and confirms reissue applicants' offer to surrender the original '832 patent upon reissue of said patent, and to the appointment of power of attorney as stated therein.

## POWER OF ATTORNEY

1. Identify the propositions associated with the following

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